



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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**(54) Title: METHOD AND APPARATUS FOR PROVIDING A CONNECTION TO A DATA NETWORK**  
**(54) Titre: PROCEDE ET APPAREIL ASSURANT UNE CONNEXION A UN RESEAU DE DONNEES**

**(57) Abstract**

A voice network node is configured to recognize the receipt of a non-routable data network access number, which may be in the form of X11, which is dialed from a subscriber terminal wishing to gain access to a data network. Either the voice network node alone, or in combination with other network nodes, requests subscriber information, including an identification of a data network service provider, from the subscriber terminal. The subscriber information is forwarded to the data network service provider identified by the subscriber information for authentication purposes. If authenticated, the subscriber terminal is connected to the data network via one of the voice network nodes. Upon termination of the connection, a voice network node sends data network connection information to the data network service provider for billing and revenue sharing purposes. In an alternate embodiment, another type of local access node, such as a cable television network node, may replace the voice network node and perform similar functions.

**(57) Abrégé**

Un noeud de réseau d'audio-messagerie est configuré pour reconnaître la réception d'un numéro d'accès à un réseau de données non acheminable, qui peut se présenter sous la forme X11, composé à partir d'un poste d'abonné désirant obtenir l'accès à un réseau de données. Le noeud de réseau d'audio-messagerie seul ou en combinaison avec d'autres noeuds de réseau, demande au poste d'abonné des informations d'abonné comprenant une identification d'un fournisseur de services de réseau de données. Les informations d'abonné sont renvoyées au fournisseur de services du réseau de données identifié par les informations d'utilisateur en vue d'effectuer l'authentification. Si le poste d'abonné est identifié, ce dernier est connecté au réseau de données par un des noeuds du réseau d'audio-messagerie. A la fin de la connexion, un noeud de réseau d'audio-messagerie envoie des informations de connexion au réseau de données au fournisseur de services du réseau de données en vue de la facturation et du partage des recettes. Dans une autre forme de réalisation, un autre type de noeud d'accès local, tel qu'un noeud de réseau de télévision câblée, peut remplacer le noeud de réseau d'audio-messagerie et effectuer des opérations similaires.

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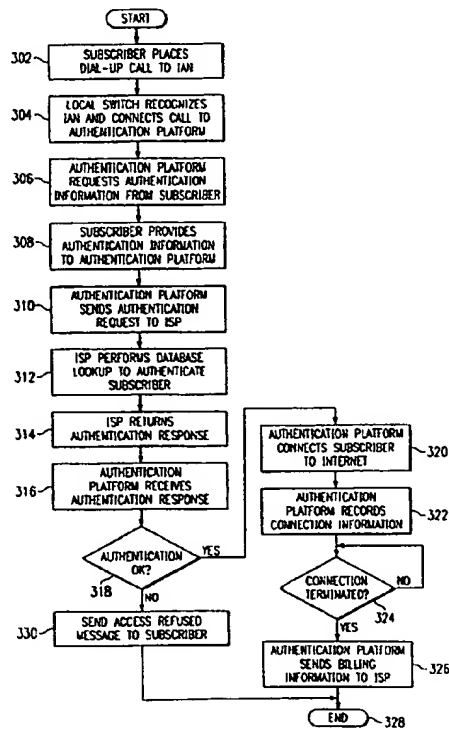
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(54) Title: METHOD AND APPARATUS FOR PROVIDING A CONNECTION TO A DATA NETWORK

## (57) Abstract

A voice network node is configured to recognize the receipt of a non-routable data network access number, which may be in the form of X11, which is dialed from a subscriber terminal wishing to gain access to a data network. Either the voice network node alone, or in combination with other network nodes, requests subscriber information, including an identification of a data network service provider, from the subscriber terminal. The subscriber information is forwarded to the data network service provider identified by the subscriber information for authentication purposes. If authenticated, the subscriber terminal is connected to the data network via one of the voice network nodes. Upon termination of the connection, a voice network node sends data network connection information to the data network service provider for billing and revenue sharing purposes. In an alternate embodiment, another type of local access node, such as a cable television network node, may replace the voice network node and perform similar functions.



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Description

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METHOD AND APPARATUS FOR PROVIDING A  
CONNECTION TO A DATA NETWORK

Field of the Invention

The present invention relates generally to providing a connection to a data network. More particularly, the present invention relates to providing a connection between a calling station and a data network via a voice network node resulting from the dialing of a predetermined access number, or via another type of local access node, such as a cable television network node.

Background of the Invention

The Internet is a data network which is greatly increasing in popularity. There are various ways of connecting to the Internet. Many larger businesses have local area networks which are directly connected to the Internet such that computers on the local area network can gain access to the Internet. However, such a direct connection to the Internet is expensive and therefore not available to small businesses and individuals. As an alternative to the direct connection, there are Internet Service Providers (ISP), which provide access to the Internet via dial-up connections. Currently, an ISP will have a point of presence (POP), which is a network node directly connected to the Internet. The POP is accessible by subscribers to the ISP by a dial-up connection. Thus, a person wanting to connect to the Internet places a modem call to a telephone number assigned to the POP, the call gets routed to the POP, and the POP acts as the gateway to the Internet for the subscriber's computer. The ISP stores information regarding connection time for each of its subscribers for billing purposes. ISP subscribers are generally billed on a flat rate basis, a connection time basis, or some combination of flat rate and connection time.

If the POP is within the subscriber's local calling area, then the subscriber is charged for a local telephone call and the dial-up connection is generally routed from the local telephone company switch to the POP. However, when a subscriber is travelling away from home, the telephone call to the POP may result in a long distance call which will result in higher long distance charges. Further, the dial-up call may be routed via several telephone network switches prior to reaching the POP, thus tying up valuable

5 telephone network resources. This long distance routing is generally inefficient for the  
telephone network, because there is often an Internet connection available to the  
travelling subscriber which is closer than the subscriber's home POP. However, since  
these POPs are operated by other ISPs, the subscriber does not have access to them. In  
10 some instances, the travelling subscriber's ISP may have a POP which is local to the  
location of the travelling subscriber. However, in order to access such a local POP, the  
subscriber must know the telephone number for dial-up access to that POP. It is  
inconvenient for the subscriber to remember the different telephone numbers of all the  
15 POPs operated by his/her ISP.

20 The problem of multiple telephone numbers for information service providers has  
been addressed in U.S. Patent No. 5,524,146. That patent describes a method for  
automatically routing calls to customer selected information sources using a dedicated  
short access number (e.g. 3-digit N11 number). When an N11 number is received by the  
telephone switch, it triggers special processing of the call. Based on prestored selection  
15 data and/or interaction with the user, the call is routed to an appropriate information  
service provider. This technique is limited to the problem of connecting to information  
service providers which are directly connected to the telephone network. Thus, the  
technique described in the '146 patent merely automates the step of determining the  
30 correct telephone number to call to access a particular information service provider.  
20 Once the telephone number is determined, the call is routed to that information service  
provider via the telephone network in a conventional manner. In contrast, in one aspect,  
the present invention is concerned with the problem of connecting a subscriber calling  
from the telephone network to a separate data network, such as the Internet. The Internet  
35 information service providers are not directly available via a telephone call as are the  
service providers described in the '146 patent.

40 Thus, there is a need for an improved technique for connecting a computer to a  
data network via the telephone network, or via another type of local access node, such as  
a cable television network node.

### Summary of the Invention

In accordance with one aspect of the present invention, a voice network node is configured to recognize the receipt of a data network access number (e.g., internet access number) from a subscriber terminal, and in response, to initiate a connection between the subscriber terminal and a data network (e.g., Internet). The data network access number may be a non-routable number of the format X11. The voice network node may initiate the connection to the data network by connecting to the data network from one of its own output ports, or by routing the call to one or more other voice network nodes and connecting to the data network from an output port of one of the other voice network nodes.

In accordance with another aspect of the invention, upon receipt of the data network access number, the subscriber is requested to enter subscriber information for authentication purposes. Only if the subscriber is authenticated does the voice network node initiate a connection to the data network. In accordance with one advantage of the invention, part of the subscriber information entered by the subscriber is an identification of the data network service provider with which the subscriber has a data network access account. The voice network node performing the authentication uses this identification to determine the correct data network service provider with which to authenticate the current subscriber. In this manner, various subscribers can access the data network via this voice network node, even if these various subscribers have data network access accounts with different data network service providers.

The invention also provides for advantageous billing arrangements. In accordance with this aspect of the invention, the voice network node records connection information for each data network access session for which it is providing, or for which it has initiated, a physical connection to the data network. Upon termination of the connection, the connection information is sent to the subscriber's data network service provider. This allows for the proper billing of the subscriber by the data network service provider. It also allows for revenue sharing between the data network service provider

5 and the company operating the nodes which provided the physical connection to the data network.

10 In various embodiments, the steps to be performed in accordance with the inventive technique are performed by a single network node or in a distributed fashion by multiple network nodes. The single network node, or one or more of the nodes in the multiple network node embodiment, may be a local telephone switch. Further, multiple local telephone switches may be configured to recognize the data network access number and upon receipt, to initiate a connection to the data network. In this manner, a subscriber may request connection to the data network using the same data network access number even if the subscriber is away from home.

15 In accordance with another embodiment of the invention, the subscriber terminal can obtain access to the data network via a local connection to another type of network, such as a cable television network. In this embodiment, the subscriber terminal does not place a telephone call, so the aspects of the invention related to the data network access number do not apply to this embodiment. However, the authentication and billing aspects of the invention apply to this embodiment.

20 These and other advantages of the invention will be apparent to those of ordinary skill in the art by reference to the following detailed description and the accompanying drawings.

#### Brief Description of the Drawings

25 Fig. 1 shows a high level block diagram illustrating the principles of the present invention;

30 Fig. 2 shows a block diagram of network elements illustrating a telephone network embodiment of the invention;

35 Fig. 3 is a flowchart showing the steps performed in accordance with one embodiment of the invention; and

40 Fig. 4 shows a block diagram of network elements illustrating a cable television network embodiment of the invention.



### Detailed Description

Fig. 1 shows a high level block diagram illustrating the principles of the present invention. In accordance with one aspect of the invention, a subscriber computer 110 is connected to a local telephone switch 120 via communication link 112. Link 112 may be a standard twisted pair POTS (plain old telephone service) line. The local switch 120 is connected to the Internet 130 via direct link 122. As used herein, the term Internet is used to refer to any data network. The local switch 120 would also be connected to other telephone network switches (not shown) in a conventional manner. An Internet Service Provider (ISP) 140 is shown connected to the Internet 130. The ISP provides Internet access accounts to subscribers wishing to access the Internet 130. In accordance with the invention, the ISP is an administrative, authentication, and billing entity, and may not provide subscribers with a physical connection to the Internet 130.

In order to gain access to the Internet 130, a subscriber using computer 110 places a dial-up telephone call from computer 110 by dialing an Internet Access Number (IAN). The IAN is a predetermined number which, in an advantageous embodiment, is a non-routable three digit number in the form of X11 (e.g. 511). The local switch 120 is configured to recognize the IAN as an indication that computer 110 is requesting access to the Internet 130. The local switch 120 sends a message to computer 110 via line 112 requesting that the subscriber enter an ISP Identification (ISP-ID), username, and password. Upon receipt of this information from the subscriber, the local switch 120 sends an authorization request message to the ISP identified by the ISP-ID. Assume that the ISP-ID entered by the subscriber corresponds to ISP 140. Upon receipt of the authorization request message, the ISP 140 looks up the account information for the subscriber identified by the username to determine if such a user is a subscriber of ISP 140 and if the password entered by the subscriber matches the password associated with the account information stored in ISP 140. If the ISP 140 determines that the subscriber is authorized, the ISP 140 sends an appropriate authorization message to the local switch via the Internet 130. Upon receipt of the appropriate authorization message, the local switch 120 connects the dial-up telephone call received from computer 110 to the Internet 130. The local switch monitors the connection time of computer 110 and reports the information to ISP 140 for billing and revenue sharing purposes.

5 The invention is described in further detail in Fig. 2 which shows one embodiment of the invention. A subscriber wanting to access the Internet is using computer 202 connected to modem 204. Although modem 204 is shown external to computer 202, modem 204 could also be internal to computer 202. The modem 204 is  
10 5 connected to a local switch 208 via POTS line 206. The local switch 208 is an intelligent switch which includes a computer processor 210 connected to a memory 214 and database 212. The functions of switch 208 are controlled by processor 210 executing computer program instructions stored in memory 214 and/or database 212.

15 Local switch 208 is connected to authentication platform 218. Authentication platform 218 includes computer processor 220 connected to modem pool 210, memory 222, and database 224. Authentication platform 218 is an intelligent network node which functions under control of computer processor 220 executing computer program instructions stored in memory 222 and/or database 224. The authentication platform 218  
20 is connected to the Internet 226. Also connected to the Internet 226 is ISP 228 and ISP 236. ISP 228 functions under control of processor 230 executing computer program instructions stored in memory 232 and/or database 234. Similarly, ISP 236 functions under control of processor 238 executing computer program instructions stored in memory 240 and/or database 244.

30 Also shown in Fig. 2 is another computer 250 connected to modem 252. Modem 252 is connected to another local switch 244. Local switch 244 includes a computer processor 254 connected to memory 256 and database 258. The functions of switch 244 are controlled by processor 254 executing computer program instructions stored in memory 256 and/or database 258. Local switch 244 is connected to authentication platform 248 which includes computer processor 262 connected to modem pool 260,  
35 25 memory 264, and database 266. Authentication platform 248 is an intelligent network node which functions under control of computer processor 262 executing computer program instructions stored in memory 264 and/or database 266. Authentication platform 248 is connected to the Internet 226. Interexchange switch 242 is shown connecting local switch 208 and local switch 244.

40 45 30 The method steps performed in accordance with the present invention in order to provide computer 202 with access to the Internet 226 are described below in accordance

5 with the flowchart of Fig. 3. In step 302 a subscriber using computer 202 places a dial-up  
modem call utilizing modem 204 to an Internet access number (IAN). For purposes of  
this example, the IAN is 511. The IAN digits are transmitted from modem 204 to local  
switch 208 via POTS line 206. In step 304 the local switch 208 recognizes the IAN as a  
10 non-routable telephone number and as a request for access to the Internet, as  
distinguished from a request to place an ordinary telephone call. Upon recognizing the  
IAN, the local switch 208 is configured to connect the call to the authentication platform  
218. The call is received by the authentication platform 218 and is assigned to one of the  
15 available modems in the modem pool 210. In step 306 the authentication platform 218  
sends a message to computer 202 requesting authentication information, including an  
ISP-ID, userid, and password, from the subscriber. In step 308 the subscriber transmits  
the ISP-ID, userid, and password to the authentication platform 218.

The ISP-ID entered by the subscriber will identify the ISP with which the  
subscriber has an Internet access account. For purposes of this example, assume that the  
15 subscriber has an Internet access account with ISP 228, and that the ISP-ID entered by  
the subscriber identifies ISP 228. In step 310 the authentication platform 218 sends an  
authentication request, including the username and password entered by the subscriber, to  
ISP 228 via the Internet 226. The ISP 228 has an Internet address which the  
25 authentication platform 218 looks up in a database using the ISP-ID. This database could  
be internal to the authentication platform 218, or it could be external to the authentication  
platform (e.g. connected to the Internet).

Upon receipt of the authorization request, in step 312 the ISP 228 determines  
35 whether the supplied username and password correspond to an authorized subscriber who  
has an Internet access account with ISP 228 by performing a database lookup. The ISP  
228 stores subscriber profile records in database 234. These subscriber profile records  
25 contain usernames, passwords, and billing information for each subscriber who has an  
Internet access account with the ISP 228. Thus, if the supplied username and password  
correspond to a valid subscriber profile record stored in database 234, the ISP 228  
determines that the subscriber is authorized. In step 314, the ISP 228 returns an  
40 authentication response to the authorization platform 218 indicating whether the  
30 authentication response to the authorization platform 218 indicating whether the

5 subscriber is an authorized subscriber to ISP 228. In step 316 the authentication platform 218 receives the authentication response.

10 In step 318 the authentication platform 218 determines whether the subscriber is authorized based on the response received from the ISP 228. If the authentication message received from the ISP 228 indicates that the subscriber is not authorized, then in step 330 the authentication platform 218 sends a message to the computer 202 indicating that access to the Internet is refused and the method ends in step 328. If the authentication message received from the ISP 228 indicates that the subscriber is authorized, then in step 320 the authentication platform 218 connects the subscriber to the Internet 226 via an output port of authentication platform 218.

20 In step 322 the authentication platform 218 begins recording connection information for the subscriber. When the subscriber terminates the connection with local switch 208 (i.e. hangs up), the authentication platform 218 recognizes that the communication link has been terminated and the test in step 324 is YES and control passes to step 326. In step 326 the authentication platform 218 sends billing information to the ISP 228 via the Internet 226. Such billing information includes the username, connection time, and an identification of the telecommunication company operating the local switch 208 and authentication platform 218. The method ends in step 328.

30 The billing information sent to the ISP 228 in step 326 allows for revenue sharing between the ISP 228 and the company operating authentication platform 218 and local switch 208. As described above, the ISP 228 is an administrative, authentication, and billing entity, and does not provide subscribers with a physical connection to the Internet. The physical connection is provided by local switch 208 and authentication platform 218, which would typically be operated by a local telephone company. The billing information sent to the ISP 228 allows the ISP 228 to bill the subscriber for access to the Internet. Since the billing information sent to the ISP 228 includes an identification of the telecommunication company operating the local switch 208 and authentication platform 218, it allows the ISP 228 to share the subscriber revenue with the company providing the physical access to the Internet.

45 In accordance with one advantage of the invention, the subscriber could travel to a different location and still gain access to the Internet in the same manner as if the

5 subscriber were using his/her home computer 202. The invention also allows for  
beneficial billing and revenue sharing as follows. Consider now that the same subscriber  
that was using computer 202 to connect to the Internet 226 from home is traveling and is  
10 using computer 250 which is located outside the area serviced by local switch 208 and  
authentication platform 218. Instead, computer 250 is connected to modem 252 which is  
connected to local switch 244. Assume that local switch 244 is configured in a manner  
similar to that of local switch 208 such that it recognizes the dialing of the IAN (e.g. 511)  
15 as a request for connection to the Internet 226. In accordance with the steps described  
above in connection with Fig. 3, the subscriber now at computer 250 will initiate a dial-  
up call to the IAN from computer 250. Upon receipt of the IAN digits, the local switch  
20 244 will recognize that the call is requesting access to the Internet 226. Thus, local  
switch 244 connects the call to authentication platform 248. The call is received by the  
authentication platform 248 and is assigned to one of the available modems in the modem  
pool 260. The authentication platform 248 will request authorization information from  
15 the subscriber now using computer 250. The subscriber enters in the same ISP-ID,  
userid, and password, as was entered when using computer 202. Thus, even though the  
subscriber is at a different computer, he/she dials the same IAN and enters the same  
authentication information, making accessing the Internet more convenient. In a manner  
similar to that described above, the authentication information is sent to ISP 228, the ISP  
20 228 authenticates the subscriber and sends an authentication message to authentication  
platform 248, and the subscriber using computer 250 is connected to the Internet.

When the Internet access session is terminated, the authentication platform 248  
35 sends billing information to the ISP 228. Since the billing information includes the  
identification of the telecommunication company operating the local switch 244 and  
authentication platform 248, the ISP 228 can now share the billing revenue from this  
25 Internet access session with the appropriate telecommunications company which  
provided the physical access to the Internet.

Thus, as can be seen, even though the subscriber has traveled to a different  
geographic location and is gaining physical access to the Internet from a different local  
45 30 telephone company, the subscriber's steps to access the Internet are the same as when  
accessing the Internet from the subscriber's home computer 202. Even the telephone

5 number dialed, the IAN, remains the same. The subscriber uses the same ISP and thus billing is simplified. Further, the ISP is able to engage in revenue sharing with the appropriate local telephone company providing physical access to the Internet.

10 In accordance with another advantage of the invention, different subscribers  
5 having accounts with different ISPs, can use the same computer to connect to the Internet in the same manner, and correct billing will take place. Assume that computer 202 is now being used by another subscriber having an Internet access account with ISP 236 instead of ISP 228. The subscriber establishes a connection to the Internet 226 in the  
15 same way as described above by dialing the IAN. When the subscriber is requested to enter his/her authentication information, the subscriber enters his/her username,  
10 password, and ISP-ID identifying ISP 236 as this subscriber's ISP. The subscriber is authenticated using ISP 236 and is provided with access to the Internet as described above. When the subscriber terminates the connection, the authentication platform 218  
20 sends billing information to ISP 236, so that ISP 236 can correctly bill the subscriber and share the revenue with the local telephone company operating local switch 208 and  
15 authentication platform 218.

25 The principles of the present invention may be implemented in many different embodiments by one skilled in the art. For example, referring back to the example  
30 discussed above in connection with Fig. 3, it is possible that in step 304 authentication platform 218 may not have any available modems in the modem pool 210 such that no  
20 modem can be assigned for use by the subscriber connecting to the Internet. In this case, the authentication platform 218 would send an appropriate message back to the local  
35 switch 208. The local switch could then re-route the call in a conventional manner to another authentication platform, such as authentication platform 248, via IXC switch 242  
25 and local switch 244.

40 In another alternate embodiment, the authentication platforms 218, 248 could be integrated into the local switches 208, 244 respectively. Thus, the appropriate computer  
program instructions could be included in the memory (214, 256) and database (212, 258)  
45 of local switches 208, 244 respectively, such that the functions of the authentication  
30 platforms are performed by the local switches. As would be understood by one skilled in

the art, the functions to be performed in accordance with the present invention may be performed by one network node, or in a distributed fashion by multiple network nodes.

In yet another alternate embodiment, although the modem pools 210, 260 are shown to be components of authentication platforms 218, 248 respectively, such modem pools could be included as components of the local switches 208, 244, or the modem pools could be external to both the authentication platforms 218, 248 and the local switches 208, 244.

In yet another alternate embodiment, although the ISPs 228, 236 are shown to be separate entities, since these ISPs provide administrative, authentication, and billing functions, and not physical connection to the Internet, they could be placed anywhere within the telecommunication network or within the Internet 226. All that is needed to provide these functions is an appropriately configured computer system including a computer processor executing appropriate computer program instructions to carry out the ISP functions and appropriate storage (e.g. memory and database). In fact, multiple ISPs could share a single computer system, as long as the information for each ISP is logically separate from the other ISP within such shared computer system. Alternatively, the ISP functions could be integrated into other network nodes.

In another embodiment of the invention, the subscriber terminal is connected to the internet via a local connection to a cable television network node. Such an embodiment is shown in Fig. 4. A subscriber wanting to access the Internet 412 is using computer 402 connected to cable modem 404. Cable modem 404 is connected to cable television network node 408 via coax cable 406. It is noted that cable 406 could also be a combination of coax cable and fiber optic cable. Cable television network node 408 and coax cable 406 are part of the cable television network. Cable television network node 408 is connected to authentication platform 410. The authentication platform is connected to the Internet 412. Also connected to the Internet 412 is ISP 414 and ISP 416. Fig. 4 also shows computer 426 connected to cable modem 424. Cable modem 424 is connected to cable television network node 420 via coax cable 424. Cable television network node 420 is also connected to authentication platform 418 which is connected to the Internet 412.

5 The elements of the embodiment shown in Fig. 4 are very similar to the  
embodiment shown in Fig. 2 except that the local telephone switches 208 and 244 of Fig.  
2 are replaced with cable television network nodes 408 and 420 respectively. Although  
10 not shown in Fig. 4, each of the cable television network nodes 408 and 420 would  
5 contain a processor, memory, and database, similar to the local switches 208 and 244 of  
Fig. 2. Of course, cable television network nodes 408 and 420 would also contain other  
elements appropriate for a cable television node. Each of the authentication platforms  
15 410 and 418 would also contain a modem pool, processor, memory, and database, similar  
to the authentication platforms 218 and 248 of Fig. 2. The modem pools of  
10 authentication platforms 410 and 418 would contain cable modems in order to properly  
communicate via the cable television network. ISP 414 and ISP 416 are configured, and  
20 operate, the same as ISPs 228 and 236 of Fig. 2. Thus, in the embodiment of Fig. 4, the  
computers 402 and 426 are connected to the cable television network via cable modems  
404 and 424 respectively. The use of cable modems to connect computers to a cable  
15 television network is well known in the art.

25 The method steps performed in accordance with the present invention in  
order to provide computer 402 with access to the Internet 412 are the same as those  
described above in accordance with the flowchart of Fig. 3. However, in the embodiment  
30 of Fig. 4, steps 302 and 304 would not be performed because computer 402 is not  
20 required to place a dial-up call when connecting to the Internet via a cable modem and  
cable television network. Instead, when computer 402 properly establishes a connection  
with cable television network node 408, the cable television network node 408 recognizes  
35 that a computer is connecting and the computer 402 is automatically connected to the  
authentication platform 410. Otherwise, the steps of Fig. 3 are performed in a similar  
25 manner in the embodiment shown in Fig. 4.

40 As will be recognized by those skilled in the art, the mobility, authentication,  
billing, and revenue sharing benefits of the invention, as described above in connection  
with the embodiment described in connection with Fig. 2, will apply in a similar manner  
to the embodiment of Fig. 4.

45 30 The foregoing Detailed Description is to be understood as being in every respect  
illustrative and exemplary, but not restrictive, and the scope of the invention disclosed



5           herein is not to be determined from the Detailed Description, but rather from the claims  
as interpreted according to the full breadth permitted by the patent laws. It is to be  
understood that the embodiments shown and described herein are only illustrative of the  
principles of the present invention and that various modifications may be implemented by  
10           5 those skilled in the art without departing from the scope and spirit of the invention. For  
example, although the subscriber terminals are shown connected to the voice and cable  
networks via wired communication links, these connections could also be provided via  
wireless communication links.

**Claims**

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I claim:

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- 1 1. A method for providing access to a data network comprising the steps of:  
2 receiving from a calling station at a voice network node dialed digits signifying a  
3 request for connection to a data network;  
4 said voice network node recognizing said dialed digits as signifying said request  
5 for connection to a data network; and  
6 said voice network node initiating a connection between said calling station and  
7 said data network.

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- 1 2. The method of claim 1 further comprising the steps of:  
2 receiving subscriber information from said calling station; and  
3 authenticating said subscriber with one of a plurality of data network service  
4 providers prior to initiating a connection between said calling station and said data  
5 network.

25

- 1 3. The method of claim 2 wherein said one data network service provider is  
2 identified in said received subscriber information.

30

- 1 4. The method of claim 1 wherein said dialed digits represent a non-routable  
2 telephone number.

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- 1 5. The method of claim 1 wherein said step of initiating further comprises the  
2 step of connecting said calling station to said data network via a port of said voice  
3 network node.

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- 1 6. The method of claim 1 wherein said step of initiating further comprises the  
2 steps of:  
3 connecting said calling station to at least one other voice network node; and  
4 connecting said calling station to said data network via a port of said at least one  
5 other voice network node.

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5 1 7. The method of claim 1 further comprising the steps of:  
2 recognizing a call termination signal from said calling station; and  
3 sending calling station connection information to said one data network service  
4 provider.

10 1 8. The method of claim 1 wherein said voice network node is an originating  
2 switch.

15 1 9. A system for providing access to a data network comprising:  
2 a first voice network node comprising:  
3 means for receiving from a calling station dialed digits signifying a  
20 4 request for connection to a data network;  
5 means for recognizing said dialed digits as signifying said request for  
6 connection to a data network; and  
7 means for initiating a connection between said calling station and said data  
25 8 network.

1 10. The system of claim 9 wherein said first voice network node further  
2 comprises:  
30 3 means for receiving subscriber information from said calling station; and  
4 means for authenticating said subscriber with one of a plurality of data network  
5 service providers prior to initiating a connection between said calling station and said  
35 6 data network.

1 11. The system of claim 9 further comprising:  
2 a second voice network node in communication with said first voice network  
40 3 node, said second voice network node comprising:  
4 means for receiving subscriber information from said calling station; and  
5 means for authenticating said subscriber with one of a plurality of data  
45 6 network service providers prior to initiating a connection between said calling  
7 station and said data network.

5

1 12. The system of claim 10 wherein said received subscriber information  
2 comprises an identification of said one data network service provider.

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1 13. The system of claim 11 wherein said received subscriber information  
2 comprises an identification of said one data network service provider.

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1 14. The system of claim 9 wherein said dialed digits represent a non-routable  
2 telephone number.

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1 15. The system of claim 9 wherein said first voice network node further  
2 comprises:  
3 at least one output port connected to said data network for connecting said calling  
4 station to said data network.

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1 16. The system of claim 9 further comprising:  
2 a second voice network node in communication with said first voice network  
3 node, said second voice network node comprising:  
4 at least one output port connected to said data network for connecting said calling  
5 station to said data network.

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1 17. The system of claim 16 wherein said second voice network node further  
2 comprises:  
3 means for recognizing a call termination signal from said calling station; and  
4 means for sending calling station connection information to said one data network  
5 service provider.

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1 18. The system of claim 9 wherein said first network node further comprises:  
2 means for recognizing a call termination signal from said calling station; and  
3 means for sending calling station connection information to said one data network  
4 service provider.

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5  
1 19. The system of claim 9 wherein said first voice network node is an originating  
2 switch.

10 1 20. A system for providing access to a data network comprising:  
2 a voice network node for receiving dialed digits from a subscriber terminal and  
3 for recognizing the receipt of a non-routable data network access number;  
4 an authentication platform connected to said voice network node for receiving a  
15 5 call from said voice network node when said voice network node receives said data  
6 network access number; and wherein  
7 said authentication platform further comprises an output port connected to a data  
20 8 network for connecting said subscriber terminal to said data network.

1 21. The system of claim 20 wherein said authentication platform further  
2 comprises:  
25 3 means for receiving authentication information from said subscriber terminal;  
4 means for transmitting said authentication information to one of a plurality of data  
5 network service providers;  
6 means for receiving an authentication response from said one data network  
30 7 service provider; and  
8 means for connecting said subscriber terminal to said data network if said  
9 authentication response indicates authorization to access said data network.

35 1 22. The system of claim 21 wherein said received authentication information  
2 comprises an identification of said one of a plurality of data network service providers.

40 1 23. The system of claim 21 wherein said authentication platform further  
2 comprises:  
3 means for sending subscriber terminal connection information to said one data  
45 4 network service provider.

5 1 24. A method for providing a subscriber terminal with access to a data network  
2 via a connection to a local network node comprising the steps of:  
3 receiving subscriber information from said subscriber terminal at a local network  
4 node;  
10 5 authenticating said subscriber with one of a plurality of data network service  
6 providers; and  
7 said local network node initiating a connection between said subscriber terminal  
8 and said data network.

15 1 25. The method of claim 24 wherein said local network node is a telephone  
2 network node.

20 1 26. The method of claim 24 wherein said local network node is a cable television  
2 network node.

25 1 27. The method of claim 24 wherein said one data network service provider is  
2 identified in said received subscriber information.

30 1 28. The method of claim 24 further comprising the steps of:  
2 recognizing a connection termination signal from said subscriber terminal; and  
3 sending subscriber terminal connection information to said one data network  
4 service provider.

35 1 29. A system for providing a subscriber terminal with access to a data network  
2 via a connection to a local network node comprising:  
3 means for receiving subscriber information at said local network node from said  
40 4 subscriber terminal;  
5 means for authenticating said subscriber with one of a plurality of data network  
6 service providers; and  
7 means for initiating a connection between said subscriber terminal and said data  
45 8 network.

5

1           30. The system of claim 29 wherein said local network node is a telephone  
2 network node.

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1           31. The system of claim 29 wherein said local network node is a cable television  
2 network node.

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1           32. The system of claim 29 wherein said one data network service provider is  
2 identified in said received subscriber information.

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1           33. The system of claim 29 further comprising:  
2           means for recognizing a connection termination signal from said subscriber  
3 terminal; and  
4           means for sending subscriber terminal connection information to said one data  
5 network service provider.

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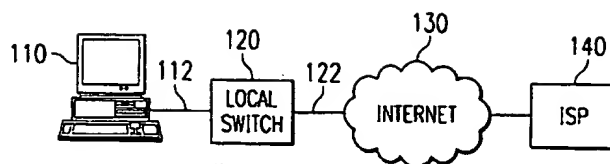


FIG. 1

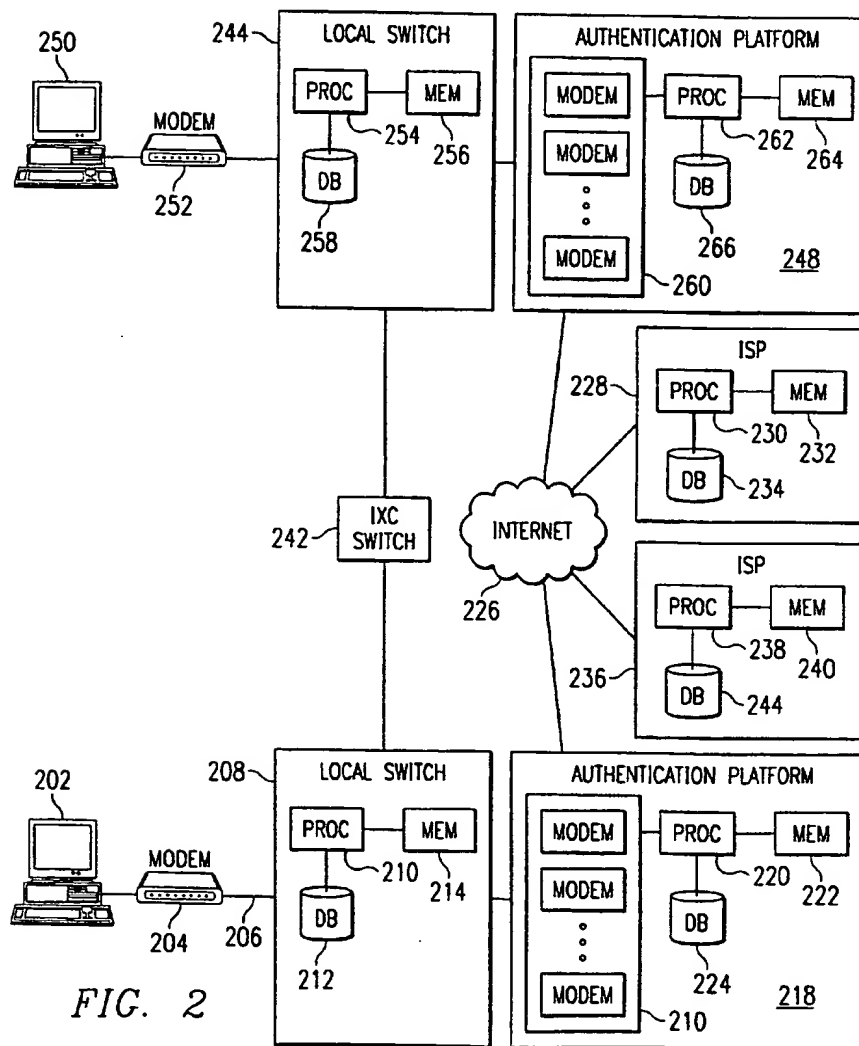


FIG. 2

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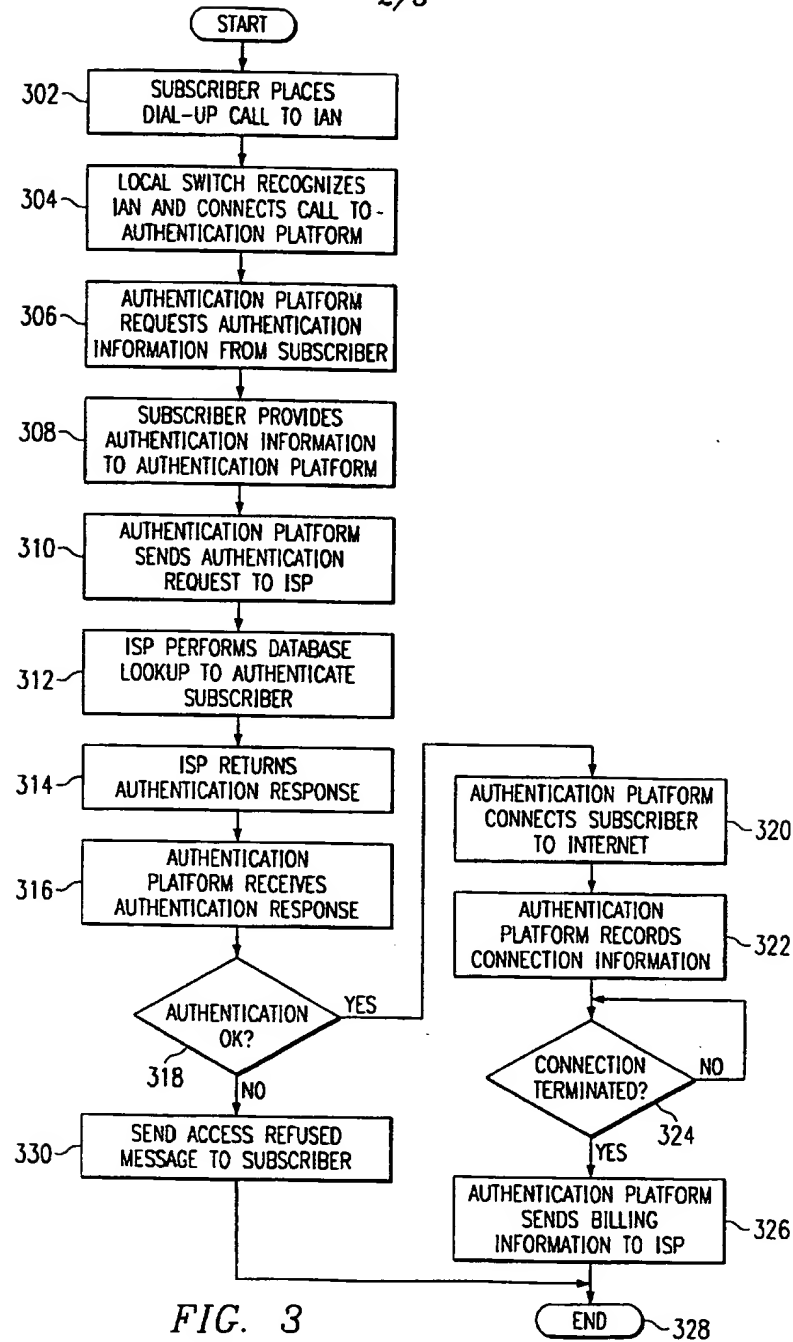


FIG. 3  
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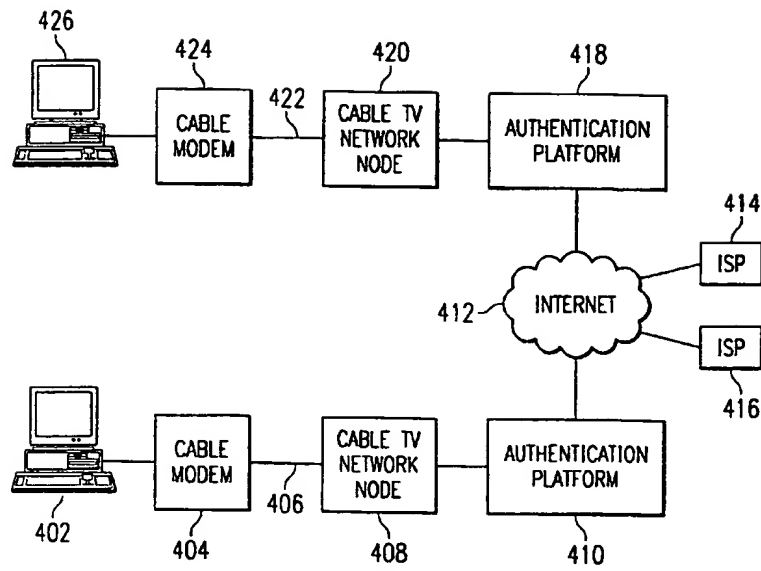


FIG. 4

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# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/US 99/16212

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 H04L29/06 H04L12/66		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 H04L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 50230 A (ERICSSON GE MOBILE INC) 31 December 1997 (1997-12-31) abstract page 1, line 12 - line 15 page 2, line 28 -page 3, line 9 page 14, line 16 - line 24 page 14, line 30 -page 15, line 3 figure 5 <div style="text-align: center; margin-top: 10px;">             ---              -/--           </div>	1,9,20, 24,29
<div style="display: flex; justify-content: space-between;"> <span><input checked="" type="checkbox"/> Further documents are listed in the continuation of box C.</span> <span><input checked="" type="checkbox"/> Patent family members are listed in annex</span> </div>		
<div style="display: flex;"> <div style="flex: 1;"> <p>* Special categories of cited documents:</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="flex: 1;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
Date of the actual completion of the international search  <div style="text-align: center;">5 November 1999</div>		Date of mailing of the international search report  <div style="text-align: center;">15/11/1999</div>
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  <div style="text-align: center;">Adkhis, F</div>

## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/US 99/16212

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>ARKKO J ET AL: "DIAL-UP SERVICE VIA THE INTEGRATED ACCESS SYSTEM" ERICSSON REVIEW, no. SPEC. INT. ISS, 1 January 1998 (1998-01-01), pages 14-19, XP000751710 ISSN: 0014-0171 abstract page 14, right-hand column, line 12 - line 35 page 15, left-hand column, line 49 -middle column, line 28 page 18, left-hand column, line 4 - line 14 page 18, right-hand column, line 13 - line 28 figure 3</p> <p>---</p>	1,9,20, 24,29
A	<p>ORLAMUENDER H ET AL: "HANDLING INTERNET TRAFFIC IN TELECOMMUNICATIONS NETWORKS" ISS '97. WORLD TELECOMMUNICATIONS CONGRESS. (INTERNATIONAL SWITCHING SYMPOSIUM), GLOBAL NETWORK EVOLUTION: CONVERGENCE OR COLLISION? TORONTO, SEPT. 21 - 26, 1997, vol. 1, 21 September 1997 (1997-09-21), pages 579-586, XP000720566 ABE S ET AL abstract page 581, left-hand column, line 7 - line 38 page 581, right-hand column, line 18 -page 582, left-hand column, line 8 page 585, left-hand column, line 7 -right-hand column, line 18</p> <p>-----</p>	1-33

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.

PCT/US 99/16212

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9750230 A	31-12-1997	US 5959988 A	28-09-1999
		AU 3577097 A	14-01-1998
		CA 2258902 A	31-12-1997
		EP 0909500 A	21-04-1999